The MSPs of the present invention are used in disks to solubilize, stabilize, manipulate membrane proteins. The MSPs of the present invention, when formulated onto disks, are applicable in surface technology such as biosensor chip for high throughput screening or solid phase assay techniques. Our work on disk scaffolds has also involved surface-associated assemblies. For instance, the SPR biosensor utilizes an approximately 50 nm thick gold film on an optical component to couple surface plasmons to a dielectric component (sample) at the surface of the gold film. MSP stabilized bilayers can be attached to the surface for use as a biomimetic layer containing proteins or other targets of interest by engineering cysteines into the MSP (Fig.15A). The use of thiols is well known for attaching molecules to gold surfaces. The placement of the cysteine depends on the model used for placement of the cysteine residue(s). Based on the belt model, cysteines can be placed along the polar side of the amphipathic helix axis, provided that a cysteine residue is not positioned at the helix-helix interface. The helix-helix interface of the belt is believed to be in register with the position of apo A-I Milano (R173C), which forms disulfide-linked dimers (Segrest et al., 1999). An alternative is to introduce cysteines within a flexible N- or C-terminal linker. Such a construct is, in theory, capable of associating either the belt or the picket fence form of disk to a gold surface. Alternatively, thiol lipids can be incorporated within the bilayer domain. In addition to SPR, surface-associated disks on gold can be used in STM and electrochemical studies, for example, such as with membrane associated redox proteins, e.g. cytochrome P450 and its flavoprotein, as well as ion channels.

In the Claims:

Rewrite Claims 5, 8, 9, 19, 27 - 35 as follows:

5. (Once amended) The membrane scaffold protein of claim 1, wherein said membrane scaffold protein self assembles in the absence of phospholipid to form a nanoscale particle between about 5 nm and about 500 nm in diameter.

8. (Once amended) The membrane scaffold protein of claim 1, wherein said membrane scaffold protein comprises an amino acid sequence selected from the group consisting of